

New Orchids from Vietnam

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Abstract

Nine species of orchids (*Anoectochilus annamensis*, *Bulbophyllum gunnarii*, *B. guttulatooides*, *Cheirostylis serpens*, *Gastrodia theana*, *Lecanorchis vietnamica*, *Liparis filiformis*, *Oberonia huensis* and *Saccolabiopsis viridiflora*) discovered recently in Vietnam are described and illustrated as new to science. All discoveries are based on materials collected along the territory of Vietnam mainly during the expeditions conducted in 2005.

Keywords: Orchidaceae, Nine new species, Vietnam

Introduction

This paper is a sequel of the publications of new orchid species discovered by the author and his colleagues from remote unstudied mountain areas of Vietnam (Averyanov, 1988a, b, 1989, 1998, 1999, 2000; Averyanov & Averyanova, 2003, 2005; Averyanov & Duong Duc Huyen, 1993).

Materials described here were collected mainly during the year 2005. All the species are arranged in alphabetical order. Following abbreviations are used in the text: Prov. (Province), Distr. (Districts), vic. (vicinity, vicinities), elev. (elevation, elevations), mt. (mountain, mountains). Collection numbers are prefixed with abbreviations as shown under:

CB, CBL – Collections of Prof. Averyanov and Dr. Nguyen Tien Hiep as principal investigators in Cao Bang limestone mountain systems supported by the research programme from U.S.A. National Geographic Society (1998-1999) and American Orchid Society (1995-1997). CP – Collections of Prof. L. Averyanov and Prof. Phan Ke Loc in Cuc Phuong National Park assisted by the research program of International Cooperative Biodiversity Groups (2000-2005). DKH – Collections of the expeditions with Dr. D Harder as Principal Investigator). HAL – Collections in collaborative explorations with Dr. Nguyen Tien Hiep, Prof. L. Averyanov, Prof. Phan Ke Loc. LX-VN – Collections of Soviet-Vietnamese Expedition done for the program *Flora of Vietnam*.

Newly discovered taxa

***Anoectochilus annamensis* Aver., *sp.nov.* Figs 1, 4a,b.**

Calcar breve, rectum; unguis dentibus vel fimbrillis paucis; petala lata obliqua; alae columnae cuneatae.

Type: VIETNAM, **Thua Thien-Hue** Prov., **Huong Thuy** Distr., Duong Hoa Municipality, Huong Thuy forest enterprise territory, around point 16°13'36"N, 107°35'09"E, SW slopes of Mang Chan ridge at elev. about 450-500 m, 12 May 2005. *L.Averyanov, P.K.Loc, T.V.Thao etc.*, HAL 8177 (Holotype, HN; Isotype, LE) Rare.

Paratypes: VIETNAM, **Tam Dao**. Flowers whitish, sepals dull brown, densely haired. 5 April 1981. Soviet-Vietnamese expedition, LX-VN 874 (LE). VIETNAM, **Thua Thien – Hue** Prov., **Nam Dong** Distr., Huong Son Municipality, around point 16°09'52"N, 107°36'22"E., at elev. about 300-450 m, 25 March 2005, *L.Averyanov, N.T.Hiep, P.K.Loc etc.*, HAL 6897 (HN; LE). Rare. VIETNAM, **Thua Thien – Hue** Prov., **A Luoi** Distr., A Roang Municipality, Tra Lenh Forestry Department station, around point 16°04'38"N, 107°29'10"E., at elev. 700-800 m., 20 April 2005, *L.Averyanov, P.K.Loc, T.V.Thao etc.*, HAL 7172 (HN). Rare. **A Luoi** Distr., A Roang Municipality, Tra Lenh Forestry Department station, around point 16°04'41"N, 107°29'06"E., at elev. 700-800 m, 21 April 2005, *L.Averyanov, P.K.Loc, T.V.Thao etc.*, HAL 7271 (HN; LE). Rare. **A Luoi** Distr., Hong Van

Municipality, Ta Lo village, around point 16° 21' 52" N, 107° 09' 36" E at elev. about 800-1000 m, 29 April 2005. *L.Averyanov, P.K.Loc, T.V.Thao, HAL 7621* (HN; LE). Not common. **A Luoi** Distr., Huong Nguyen

Municipality, in vic. of Tra Ve forest protection station, around point 16° 13' 47" N, 107° 27' 47" E at elev. about 120-300 m, 3 May 2005, *L.Averyanov, P.K.Loc, T.V.Thao etc., HAL 7766* (HN). Rare.

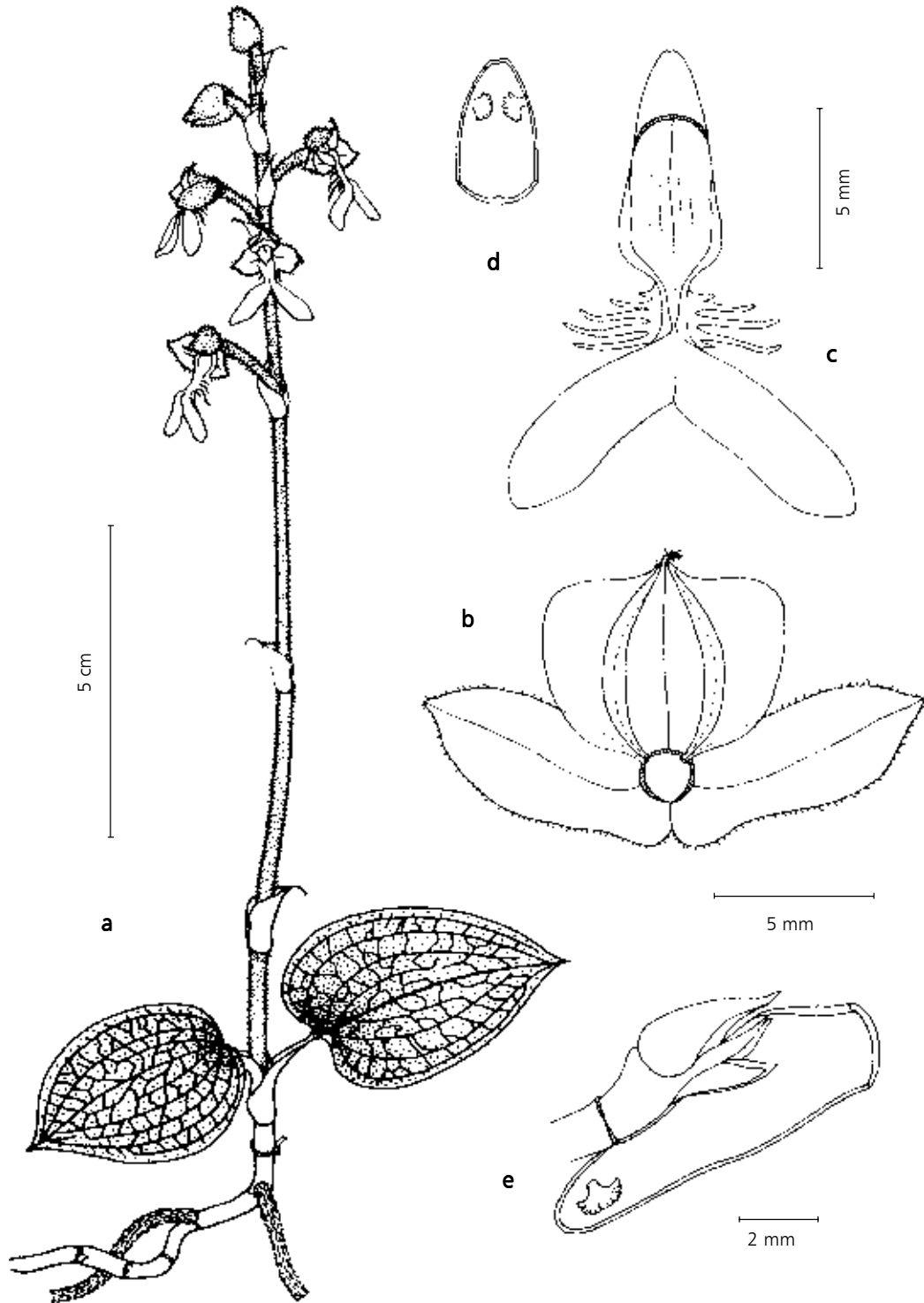


Figure 1. *Anoectochilus annamensis* Aver. – a. Flowering plant; b. Flattened sepals and petals; c. Flattened lip; d. Section of spur apex with lateral glands; e. Column (lateral view) and sagittal section of spur (all drawn from the type by the author).

Creeping terrestrial herb with ascending leafy floriferous stem; plagiotropic part of stem 4-7 cm long, green, juicy, rooting at nodes, ascending leafy part about 2-3 cm with 2-3 leaves. *Leaves* petiolate, petiole and sheath 1-1.5 cm long, 1-1.5 mm wide; leaf blade ovate, usually slightly asymmetric, undulate along margin, shortly acute, 3-5 cm long, 2.2-3.5 cm wide, deep velvety green, olive-green to nearly black with reticulate network of pink nerves above, uniform dull pink-purple below. *Scape* 7-16 cm long, densely finely tomentose, rachis lax flowered, normally with 3-10 flowers; floral bracts light brown, triangular-cuneate, acuminate, 4-6 mm long, 2-4 mm wide, pedicel with ovary 6-10 mm long, 1-1.5 mm wide, densely pubescent with simple and glandular hairs. *Sepals* olive-brown to dull reddish-brown, densely pubescent outside; dorsal sepal ovate, 4.5 mm long, 3.5 mm wide, acuminate, with strongly upward reflexed apex; lateral sepals oblong, obtuse, with broad asymmetric base, about 7-9 mm long, 3-4 mm wide, petals light green, glabrous, 4.5 mm long, 3-3.2 mm wide, strongly oblique, falcate, rising from very narrow base to oblique broad apical part ending in attenuate tip, densely connivent and forming a hood with the dorsal sepal. *Lip* white with light green fringes, about 17 mm long from tip of spur to apex of epichile, distinctly divided into hypochile, mesochile and epichile, hypochile boat-shaped, 5-6 mm long, 2-3 mm wide, with few indistinct nerves and swollen upturned fleshy margins, basally with short, broadly-conical spur, 3 mm long, 2 mm broad, spur not bent, placed in one line with lip, notched at apex, with 2 large flat stalked semicircular glands inside; mesochile forming narrow claw about 1.5 mm long, with fleshy upturned margins and 2-5 back reflexed lateral dents or fringes 1-3.5 mm long; epichile 2 lobed, the lobes spreading, oblong to oblong-lanceolate, about 8 mm long, 3 mm wide; column 5-5.5 mm tall, with 2 vertical wings at front, wings 2-2.5 mm long, cuneate or narrowly-triangular, acute, rising from the middle of the lip; anther large, narrowly-ovate, about 4 mm long.

Etymology: Species name refers to the area of its distribution, which includes mainly lowland and montane regions of central Vietnam (Annam).

Flowering: March-May.

Ecology: Creeping, terrestrial, shade-loving herb of forest understorey distinguished by its handsome pink-nerved leaves. Primary and secondary wet broad-leaved, evergreen, closed, lowland to submontane forests on clayey shale, sandstone, quartzite and granite at elev. 120-1000 m.

Distribution: VIETNAM (Thua Thien-Hue Prov., Huong Thuy, Nam Dong and A Luoi Districts).

Note: Discovered plants superficially resemble the widespread common species – *Anoectochilus roxburghii* (Wall.) Lindl., this may explain why it was overlooked by earlier authors. Actually *A. annamensis* belongs to the group of species with straight (not bent) short spur like *A. brevilabris* Lindl. (= *A. griffithii* Hook. f., *A. sikkimensis* King et Pantl.) and *A. tridentatus* Seidenf. Newly described species may be widespread in low mountain areas of Vietnam. The plant collected by the team of Soviet-Vietnamese expedition in 1981 in Tam Dao Range (Vinh Phuc Prov., northern Vietnam, LX-VN 874) and mentioned by Gunnar Seidenfaden as a paratype of *A. tridentatus* (Seidenfaden, 1992) also belong to this species, which strikingly differ in long fringes along lateral claw margins.

***Bulbophyllum gunnarii* Aver., sp. nov. Figs 2, 4 c, d.**

Inflorescentia laxa, brevis, floribus late apertis; stelia subulata, anthera duplo longiora; auriculae labii margine apicali irregulariter dentatae.

Type: VIETNAM, Kien Giang Prov., Tho Chu island, 9° 01'N, 103°26'E., 10 April 1987, Averyanov L., Kudriavtzeva E., 1094. Flowered under cultivation on 20 January 1990 (Holotype, HN; Isotype, LE).

Paratype: VIETNAM, Gialai-Kontum Prov., Konplong, Mang Den. Epiphyte on broad-leaved tree in open coniferous forest. Russian-Vietnamese Expedition, 28 May 1985, Averyanov et al., LX-VN 2288. Flowered under cultivation 18 October 1986, (HN; LE).

Creeping epiphyte and lithophyte with long rigid woody rhizome, rhizome 2-3 mm thick, irregularly, longitudinally wrinkled, naked, rooting at nodes, with erect, 1 leaved pseudobulbs at a distance of 2-5 cm, broadly-ovate to sub-spherical. *Pseudobulbs* deep olive-green, 2-3 cm tall, 1-1.5 cm wide, covered with yellowish-brown fibrous and gray kapok-like remains of early disintegrated bracts. *Leaves* erect, rigid, coriaceous, shortly petiolate; petiole 1-1.5 cm long, 2-3 mm across; leaf blade oblong-lanceolate to oblong-elongate, 10-17 cm long, 1.5-2.2 cm wide, with unequally bilobed apex; lobules half rounded. *Inflorescence* arising from the base of pseudobulb, 4-5 cm long, much shorter than leaves, fewflowered, arching to pendulous; scape 2-3 cm long, thick, curved, light olive-green, speckled purplish, with 2-4 overlapping, broad, yellowish, retuse bracts at the base; rachis 2-3 cm long with 5-10 lax flowers; flower bracts ovate, acute to shortly acuminate, 4-6 mm long,

1.5–2 mm wide, dull pale yellowish with 1–3 indistinct dull purple-brown nerves; pedicel and ovary dull yellowish-olive, speckled with purple, glabrous, 4–5 mm long. *Flowers* widely opening, with strong unpleasant smell, 6–8 mm across, light olive-

yellowish; sepals sub-similar, with 3–5 brown to brown-purple stripes, ovate, 6–8 mm long, 2.5–4 mm wide, obtuse; lateral sepals slightly oblique with broad base adnate to column foot; petals with 2–3 indistinct brown to brown-purple stripes, narrowly

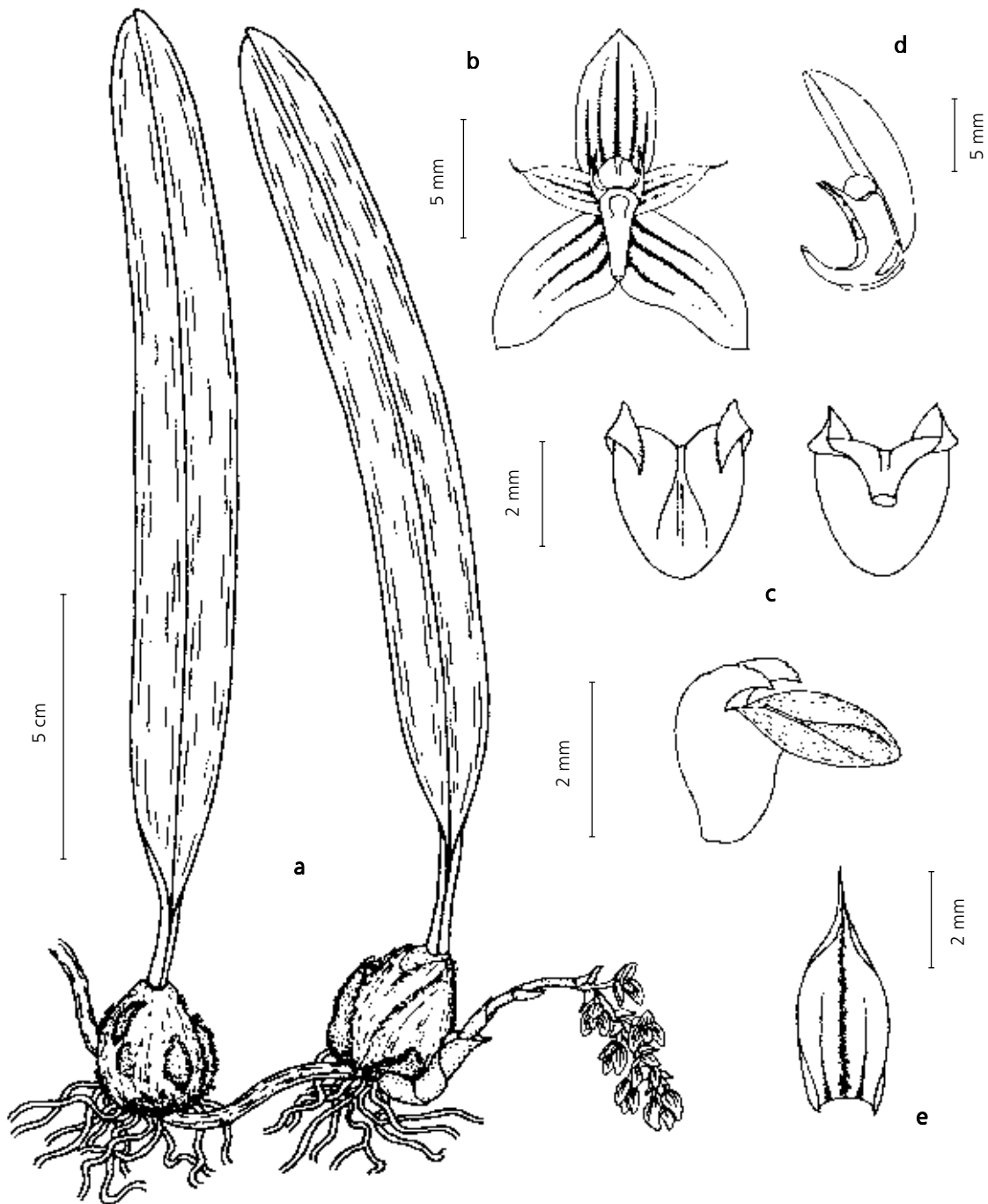


Figure 2. *Bulbophyllum gunnarii* Aver. – a. Flowering plant; b. Flattened sepals and petals; c. Lip, frontal view, view from behind and side view; d. Column and dorsal sepal, side view; e. Floral bract (all drawn from the type by the author).

ovate, 2.5-3 x 1-1.5 mm, aristate, with prominent long subulate apical straight thread; lip olive-brown, often with purple tint, ovate to elliptic, fleshy, strongly decurved, 2.5-3.5 mm long, 2.5-3 mm wide, longitudinally grooved, with erect, falcate auricles irregularly finely denticulate along upper margin; epichile finely longitudinally wrinkled, with low central swelling toward apex; column 1.5-2 mm tall and broad, with long narrow subulate acute stelia twice longer than anther cup at the apex; column-foot long, strongly curved, rising, 1.5-1.8 mm long; anther yellow, cup hemispherical, 0.7-0.8 mm across.

Etymology: The species is named in honour of Mr. Gunnar Seidenfaden.

Flowering: October-January.

Ecology: Primary and secondary open dry broad-leaved and coniferous lowland forests and woodlands at elevation 50-600 m.

Distribution: VIETNAM (Gialai-Kontum Prov., Konplong; Kien Giang Prov., Tho Chu island).

Note: Many years ago I discussed the identity of this species with Mr. Gunnar Seidenfaden who eventually was right regarding it as a separate taxon different from all other known species of section *Careyana* Pfitz. Though these plants are obviously different from closest *Bulbophyllum careyanum* (Hook.) Spreng. and *B. laoticum* Gagnep., they remained undescribed till now. This publication implements this omission.

***Bulbophyllum guttulatoides* Aver., *sp.nov.* – *B. guttulatum* auct. non (Hook. f.) Balakr., 1970: Aver. et Averyanova, in Updated Checklist. Orch. Vietnam : 15 (2003).**

Figs 3, 4 e-g.

Sepala truncata mucrone apicali brevi, inflorescentia uniflora brevis (foliis duplo brevior), stelia magna dilatata apice columnae lateraliter dispositae.

Type: VIETNAM, Ninh Binh Prov., Nho Quan Distr., Cuc Phuong Municipality, Cuc Phuong National Park, about 0.5 km W from Bong locality, 20° 21' 01" N, 105° 35' 38" E., about 500 m, 20 May 2002, L. Averyanov, P.K.Loc etc., HAL 1651 (Holotype, HN; LE, photo). Common.

Paratypes: VIETNAM, Ninh Binh Prov., Nho Quan Distr., Cuc Phuong Municipality, Cuc Phuong National Park, Dang locality, about 1 km WNW of Dang Forest Control point, 20° 16' 28" N, 105° 40' 57" E., at elev. about 400 m. 19 May 2002, L. Averyanov, P.K.Loc etc., HAL 1642 (HN; LE, photo). Occasional. Ninh Binh Prov., Nho Quan Distr., Cuc Phuong Mun., living collection of Cuc Phuong National Park,

20° 15' 15" N, 105° 41' 40" E., 22 May 2002, Averyanov, P.K.Loc, CP-127 (HN, LE).

Creeping epiphyte and lithophyte, rhizome 1.5-2 mm thick, long, rigid, woody, rooting at nodes, covered with brownish sheaths, with erect pseudobulbs at a distance of 2-5 cm, narrowly ovate to ovate, 1-leaved pseudobulbs 0.8-1.2 cm tall, surrounded with numerous erect fibers of early-disintegrated sheaths. *Leaves* coriaceous, subsessile or shortly petiolate; leaf blade lanceolate to narrowly-elliptic, 6-10 cm long, 0.6-1.2 cm wide. *Inflorescence* appearing from the base of pseudobulb, 3-5 cm long, much shorter than leaves, 1 flowered; scape very thin, erect, purplish, with 1-2 cuneate, acute, bracts; pedicel and ovary purple, glabrous, 8-10 mm long. *Flowers* not widely opening, 1.2-1.8 cm long; sepals yellow, speckled with purple; dorsal sepal broadly ovate, 9-10 mm long, 5-7 mm wide; lateral sepals 12-14 mm long, 5-7 mm wide, ovate, attenuate, connate with lower and along upper margin near the apex, forming short broad mentum; petals 5-6 mm long, 2.5-3 mm wide, purple-brown, obliquely ovate to broadly falcate, obtuse, with short apical mucro; lip narrowly-ovate, simple, fleshy, strongly decurved, 2-3 mm long, 1-1.5 mm wide; column 2-2.5 mm tall with large stelia dilated at the apex and large, broad wings in front; column-foot long, curved, 3.5-4 mm long.

Etymology: Species name refers to the specific epithet of the most similar species (*Bulbophyllum guttulatum*).

Flowering: April-June.

Ecology: Primary and secondary shady, broad-leaved, evergreen, closed, lowland forests on highly eroded rocky, marble-like limestone at elevation 400-500 m.

Distribution: VIETNAM (Ninh Binh Prov., Nho Quan Distr., Cuc Phuong National Park).

Note: This new species distinctly differs from the closely related *Bulbophyllum guttulatum* (Hook. f.) Balakr. (distributed in Nepal, Bhutan, North East India and China) and *B. umbellatum* Lindl. (distributed in Bhutan, North East India, Myanmar, Thailand and Vietnam) in having short 1 flowered inflorescence, scape much shorter than leaves, large stelia and mucronate tips of sepals. It is probably rare and a local endemic of lowland limestone areas of central part of northern Vietnam.

***Cheirostylis serpens* Aver., *sp.nov.* Figs 5, 8a, b.**

Inflorescentia 1-2 cm longa, 1(3) flora; ovarium et sepala extus pilosa; labium basi lateris duabus papillis duabus longis donatum; labium apice bilobum, lobis margine integris.

Type: VIETNAM, **Quang Binh** Prov., **Bo Trach** Distr., Tan Trach Municipality, vic. of A Rem village (17° 23'32"N, 106° 12'46"E), Phong Nha - Ke Bang

National Park, at elev. about 650-750 m, 24 January 2005, *L.Averyanov, P.K.Loc, N.T.Vinh etc.*, HAL 6092 (Holotype, HN; Isotype, LE). Rare.

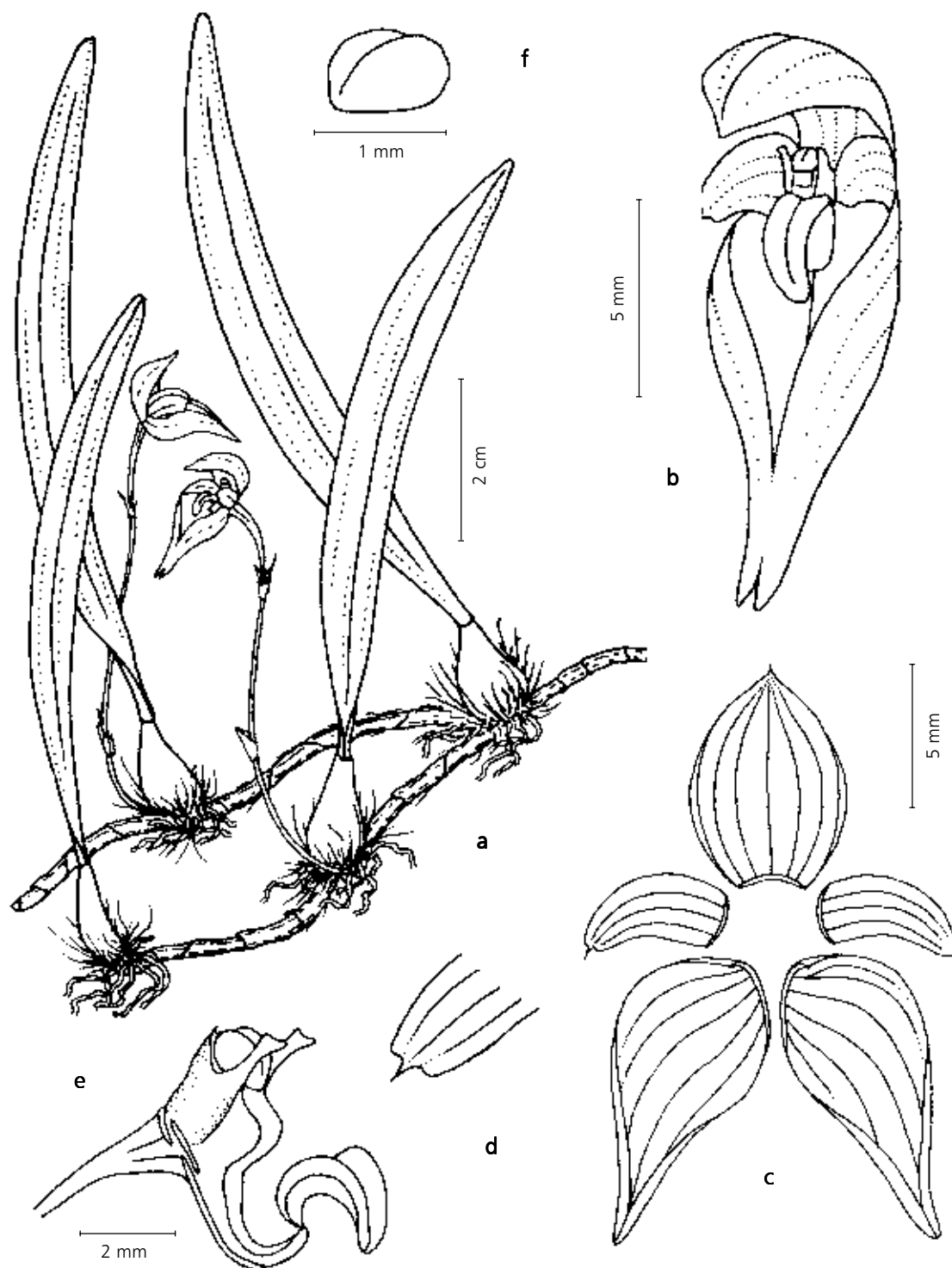


Figure 3. *Bulbophyllum guttulatoides* Aver. – **a.** Flowering plant; **b.** Flower; **c.** Flattened sepals and petals; **d.** Apex of petal; **e.** Column and lip, lateral view; **f.** Operculum (all drawn by the author: a – from type, b-f – from paratype, CP-127).



Figure 4. *Anoectochilus annamensis* Aver. – **a, b.** Flowering plant and flower (type specimen); *Bulbophyllum gunnarii* Aver. – **c, d.** Flowering plant and inflorescence (type specimen); *Bulbophyllum guttulatoides* Aver. – **e-g.** Flowering plant and flower (type and isotype specimens). All photographed by the author.

Paratype: VIETNAM, **Bac Kan** Prov., **Cho Don** Distr., Ban Thi Municipality, village Phia Khao, Lung Li valley, around point 22° 16'10"N, 105° 31'01"E, Cot Moc mt. at elev. 800-900 m, 23 May 2004, *L.Averyanov, N.T.Hiep, P.V.The, N.T.Vinh, HAL 4804* (HN, LE). Rare.

Lithophytic or epiphytic dwarf plant with miniature tiny rootless creeping stem and short ascending leafless inflorescence. *Stem* creeping, with many leaves articulated at nodes, with tufts of numerous root hairs on basal surface, internodes brightly green, swollen, fleshy, narrowly ovate to sub-spherical, 2-4 mm long, 1.5-3 mm broad. *Leaves* sessile, cordate-acute or shortly acuminate, 4-7 mm long, 4-5 wide, brightly emerald-green. *Scape* ascending, 1.5-1.8 cm long, sparsely hairy, with 2-3 small light greenish to hyaline shortly acuminate bracts and 1 (3) hardly opening flowers. *Sepals* about 3.5 mm long, connate half way to tip from base, obtuse, green, sparsely haired outside; dorsal sepal ovate, about 2.5 mm wide, lateral sepals narrowly-ovate to oblong, about 1.5 mm wide; petals spathulate, falcate, broadening from very narrow base to rounded apex, white, 3-3.5 mm long, 1-1.4 mm wide; lip white, about 2.5 mm long, distinctly separated into hypochile and epichile by the constriction of very fleshy swollen margins; hypochile broad, concave, cup-like, about 2.5 mm long, 1.8-2 mm broad, with upturned sides, central swelling and 2 long, more or less straight papillae on each side; epichile white with 2 light olive-green oblong spots at the center, 4 mm wide, 2-lobed, with broad square lobes, entire along margin, often slightly undulate and plicate; column about 2 mm long with large, narrowly-ovate anther; rostellum arms narrowly-subulate, acute, as long as or little longer than the anther; stelidia large, of the same length, spathulate, with obtuse to roundish apex.

Etymology: Species name refers to the creeping character of the plant.

Flowering: January - February.

Ecology. Dwarf herb with juicy, succulent stem densely adpressed to the ground. Primary broad-leaved, evergreen, closed, forest on rocky, highly eroded, solid and stratified marble-like crystalline limestone at elevations about 650-900 m. Grows commonly as lithophyte on shady, mossy vertical cliffs or as epiphyte on large mossy shady boles of old trees near the ground.

Distribution: VIETNAM (**Bac Kan** Prov., **Cho Don** Distr., **Quang Binh** Prov., **Bo Trach** Distr.).

Note: The new species differs from the most similar *Cheirostylis moniliformis* (Griff.) Seidenf. occurring in

Bhutan by its miniature habit, short haired inflorescence and epichile with entire margin. Samples observed have inflorescences with 1 flower. However, a number of abbreviated floral bracts at the apex of some inflorescences indicate that they can be more flowers. Probably endemic to northern Vietnam and ecologically obligated with highly eroded ancient rocky limestone mountains at elevations 650-900 m.

Gastrodia theana* Aver., *sp.nov.

Figs 6, 8c-e.

Petala anguste triangularia, acuta; labium cordatum, basi callis duabus sphaericis; stelidia apice columnae lateraliter disposita, longa, angusta, supra antheras inflexa.

Type: VIETNAM, **Thua Thien-Hue** Prov., **Nam Dong** Distr., Huong Son Municipality, around point 16° 09'58"N, 107° 36'07"E., at elev. 300-400 m, 31 March 2005, *L.Averyanov, P.K.Loc, P.V.The, A.Averyanova, N.T.Vinh, HAL 7165* (Holotype, HN; Isotype, LE). Very rare.

Terrestrial tuberiferous leafless achlorophyllous saprophyte. *Tubers* fleshy, gray-brown, finely irregularly verrucose, covered with numerous triangular acute scales or naked, hairy, cylindrical, 2-4 cm long, 4-8 mm thick. *Stem* erect, fleshy, soft, straight or slightly flexuose, white to light yellowish-brown, 2.5-5 cm tall, 2-4 mm thick, with 2-3 broad, ovate, obtuse bracts, 3-5 mm long, 2-4 mm wide, with numerous close imbricate small triangular acute decaying gray-brown scales and with a few narrow straight roots at the base. *Inflorescence* terminal dense raceme with 3-8 close flowers; floral bracts white to light yellowish-brown, ovate, rounded to obtuse, 2-5 mm long, 1.5-2 mm wide; pedicel and ovary 3-5 mm long, ovary 2-2.5 mm thick, white to light pink-brown. *Flowers* bell-shaped, hardly opening, fleshy, slightly flattened from ventral side; lasting more than one day, sepals and petals with incurved tips, never spreading; sepals and petals roughly verrucose outside, with irregularly warty dorsal ridge-like keel rising toward the apex; sepals white to light pinkish-brown, subsimilar, oblong-ovate, 0.8-1.5 cm long, 3.5-5 mm wide, with very fleshy apex, obtuse, connate with petals on 9/10-14/15; lateral sepals connate each other on 1/4-1/3 of their length from the base; petals salmon-pink, thin, oblong, 1-1.3 cm long, 3-4 mm wide; free part of petals fleshy, very small, sometimes hardly visible, shorter than sepals, narrowly-triangular, 0.4-0.8 mm long, 0.2-0.3 mm wide; lip green with salmon-red apex and base; 5 nerved, 3.5-4 mm long, 2.5-3 mm wide, entire, finely

denticulate along margin, flat, cordate, attenuate to blunt or acute apex; disc with thick short keel-like median callus near lip apex and two white spherical calli at suddenly narrowing lip base; column white, stout, straight, 4-4.5 mm tall, 1.4-1.6 mm wide, with long narrow stelidia on lateral sides at the apex, incurving below anther, at the base with very short

column foot; anther cup light pink, hemispheric, about 0.6-0.7 mm across.

Etymology: The species is named in honour of its discoverer, young Vietnamese botanist – Pham Van The.

Flowering: March-April.

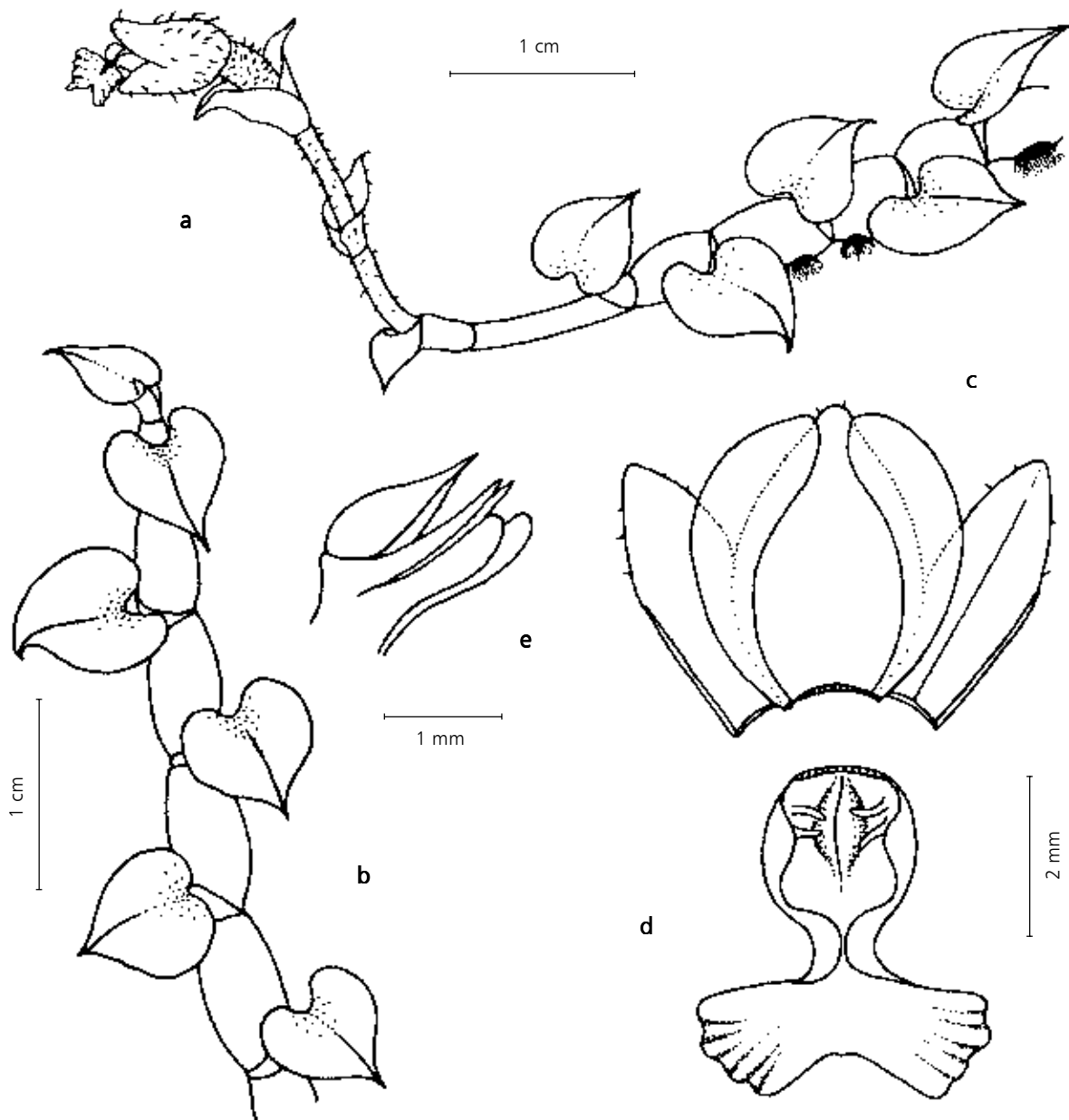


Figure 5. *Cheirostylis serpens* Aver. – **a.** Flowering plant; **b.** Vegetative part of shoot; **c.** Flattened sepals and petals; **d.** Flattened lip; **e.** Column, lateral view (all drawn from the type by the author).

Ecology: Primary evergreen, lowland, closed, broad-leaved, forests on shale and sandstone at elevations 300–400 m.

Distribution: VIETNAM (Thua Thien-Hue Prov., Nam Dong Distr.).

Note: New species superficially similar to *Gastrodia verrucosa* Blume recorded from Japan, Malacca, Sumatra and Java, but distinctly differs in very small, hardly visible narrowly-triangular free part of petals and cordate base of the lip. This rare, strictly endemic plant is a typical element of the aboriginal warm-loving lowland flora of central part of Vietnam.

***Lecanorchis vietnamica* Aver., *sp. nov.* Figs 7, 8 f–i.**

Sepala petalaeque 8–11 mm lg.; labium basi sacciformiter inflatum, lobis lateralibus late cuneatis, acutis.

Type: VIETNAM, Thua Thien-Hue Prov., A Luoi Distr., A Roang Municipality, Tra Lenh Forestry Department station, around point 16° 04'38"N, 107° 29'10"E, at elev. 700–800 m, on tops of ridge. 20 April 2005. L.Averyanov, P.K.Loc, N.T.Vinh. etc., HAL 7247 (Holotype, HN; Isotype, LE). Rare.

Paratype: VIETNAM, Thua Thien-Hue Prov., Nam Dong Distr., Huong Son Municipality, around point 16° 09'52"N, 107° 36'22"E, at elev. c. 300–450 m, 27

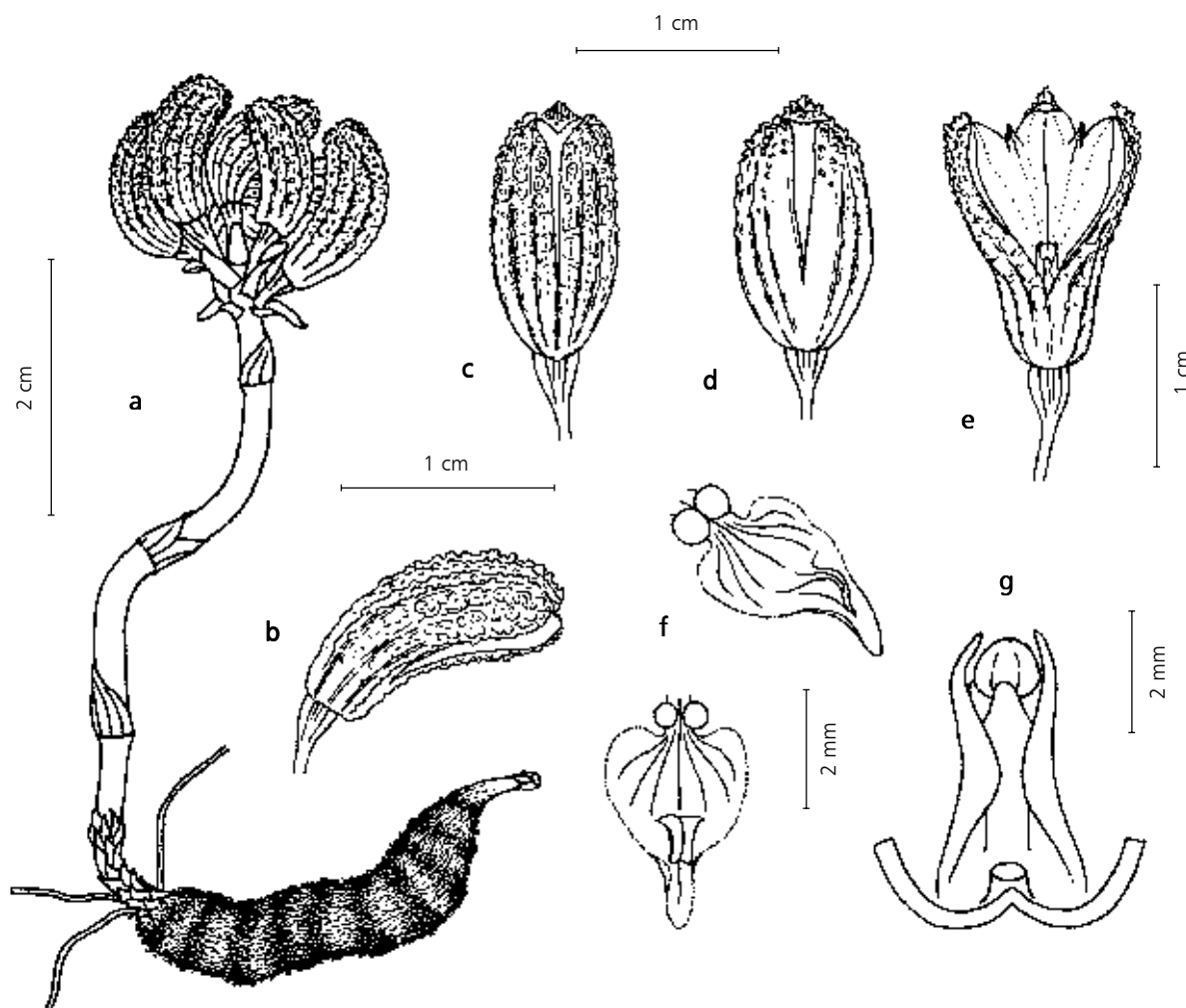


Figure 6. *Gastrodia theana* Aver. – a. Flowering plant; b, c. Opening flower buds; d. Open flower; e. Flower with unfolded and flattened tepals; f. Lip, side and frontal view; g. Column, frontal view (all drawn from the type by the author).

March 2005, *L.Averyanov, N.T.Hiep, P.K.Loc etc., HAL 6982* (HN; LE).

Terrestrial rhizomatous leafless achlorophyllous saprophyte. Rhizome vertical, rigid, gray-brown, thin, 2-3 mm thick. *Stem* slender, erect, straight or slightly flexuose, very brittle, deep chestnut-purple to nearly black, 12-30 cm tall, 0.5-1 mm thick, with numerous distant broad, short, obtuse bracts, 1-3 mm long, 1-2 mm wide, with a few thick gray-brown roots at the base. *Inflorescence* terminal lax spike with (1)3-4(5) flowers and zigzag axis; floral bracts greenish-brown, short and broad, ovate, obtuse or broadly acute, glabrous, 0.1-0.5 mm long, 0.5-0.8 mm wide; pedicel and ovary 8-12 mm long, 0.3-0.5 mm thick, dull olive-brown to pinkish. *Flowers* hardly opening; sepals and petals subsimilar, light brown, olive-brown, yellowish-brown to nearly white, oblong-spathulate, with three indistinct veins, 8-11 mm long, 1.8-3 mm wide; lip with a few nerves at the middle, 8-11 mm long, 5-8 mm wide, adnate at the base to lateral sides of column and forming inflated sac-like nectary, 1.5-2.5 mm long, 1.2-2 mm wide; lip blade broadening to 3-lobed apex; side-lobes erect, triangular-cuneate to broadly-falcate, acute, 1.5-2.5 mm long, 1-1.8 mm wide, mid-lobe turned down at right angle, oblong-obovate, 2-3 mm long, 2.2-3 mm wide, usually longer than wide, rounded at apex, densely covered with long, flexuose, white to light yellowish-pink hairs; column without column-foot, straight, 5-6 mm tall, broadening from narrow base to broad apex, 1-1.5 mm wide, stigma in the form of fleshy ovate finely papillose lamella reflexed forward from column; anther cup hemispheric, about 1 mm across. *Fruit* cylindrical to narrowly-elliptic black capsules, 18-24 mm long, about 3 mm wide; calyculus short campanulate, 0.5-1 mm long, 1 mm wide, with irregular-erose, acute dents, in fruits with reflexed spreading dents, 1.5 mm across.

Etymology: Species name refers to the country of origin.

Flowering: March-May.

Ecology: Primary closed, broad-leaved, evergreen, lowland forests on shale and granite at elevation 450-800 m, commonly along ridge edges and on mountain tops.

Distribution: VIETNAM (**Thua Thien-Hue Prov.**, A Luoi and Nam Dong Distr.).

Note: This new species differs from the most similar *Lecanorchis malaccensis* Ridl. in much smaller flowers, inflated sac-like base of the lip and its broadly cuneate, acute side-lobes. The species is

probably endemic to low mountain areas of the central part of Vietnam.

***Liparis filiformis* Aver., *sp.nov.* Figs 9, 11 a, b.**

Columna lateraliter alis accessoriis deficientibus, antice alis largis tota longitudine percurrentibus, apice amplificata; labium trilobum, lobis lateralibus rotundatis, lobo medio triangulari, acuto.

Type: VIETNAM, **Cao Bang** Prov., **Ba Be** Distr., Ba Be national park, primary shady wet evergreen forest on slopes of limestone mt. at elev. 400-600 m, 24 Oct. 1995, *L.Averyanov, N.T.Hiep, D.D.Huyen, CB 47* (Holotype, HN; Isotype, LE). Common.

Paratypes: VIETNAM, **Cao Bang** Prov., **Nguyen Binh** Distr., Ca Thanh municipality, vic. Ca Lu village, about 7-8 km to SE from Yen Lac village (22° 44'N 105° 50'E), about 38 km to NWW from Cao Bang town, at elev. 1350 m, 21 Nov. 1998, *Averyanov L., P.K.Loc, N.X.Tam, CBL 561* (HN, LE). Rare. VIETNAM, **Ha Giang** Prov., **Quang Ba** Distr., at Sin Suoi Ho village and river, at 23° 06'57"N, 105° 01'48"E, at 514-900 m, 1 April 2000, *D.K.Harder, N.T.Hiep, L.V.Averyanov, N.Q.Hieu, DKH 4826* (HN, LE, MO). Rare. VIETNAM, **Ninh Binh** Prov., Cuc Phuong National Park. Primary evergreen seasonal broad-leaved lowland dry forest on steep rocky slope of limestone hills. 8 Jan. 2003, *L.Averyanov, P.K.Loc, N.M.Cuong, N.T.Vinh, HAL 2901* (HN, LE). VIETNAM, **Thanh Hoa** Prov., **Ba Thuoc** Distr., Thanh Son Municipality, SW macro slope of middle part of Pu Luong range around point 20° 28'30"N, 105° 05'16"E, at elev. 1500-1550 m, 10 October 2003, *L.Averyanov, P.K.Loc, D.T.Doan, N.T.Vinh, HAL 4273* (HN, LE). Occasional. VIETNAM, **Cao Bang** Prov., **Trung Khanh** Distr., Ngoc Khe Municipality, Pac Nga village, around point 22° 54'59"N, 106° 31'44"E, at elev. 700-750 m, 10 June 2004, *L.Averyanov, P.K.Loc, P.V.The, N.T.Vinh, HAL 5543* (HN, LE). Rare.

Miniature epiphyte with numerous close clustering pseudobulbs. *Pseudobulbs* ovate to narrowly-ovate, 0.5-1 cm tall, normally with 2 leaves, covered with 1-2 thin white papyraceous bracts at the base. *Leaves* shortly petiolate or sessile, lanceolate to narrowly elliptic, 2-7 cm long, 0.5-0.8 cm wide, acute to shortly apiculate. *Inflorescence* filiform, very thin, slender, pendulous, with many lax flowers opening in succession, 6-18 cm long, much longer than leaves. *Scape* filiform, 3-10 cm long with numerous large greenish bracts; bracts 2-4 mm long, 0.5-1.5 mm wide with broad base and attenuate to acuminate apex; rachis filiform, 2-7 cm long, irregularly ridged, sometime slightly zigzag flexuose; floral bracts ovate to cuneate, acuminate 1-1.5 mm long, 0.2-0.3 mm

wide; pedicel and ovary 2-2.5 mm long. *Flowers* olive-green, light brown to dull brown-orange, widely opening, 5-6 mm across; sepals ovate to broadly-ovate, 3.5-4.5 mm long, 2-3.5 mm wide, with revolute edges, orbicular to obtuse at apex; petals linear of the

same length, 0.3-0.4 mm wide; lip strongly bent downwards from a short hypochile, forming vertical ears at the bent; epichile sub-quadrate, 2-2.5 mm long and broad; apex with 3 lobes; lateral lobes more or less rounded, mid-lobe narrowly-triangular, acute;

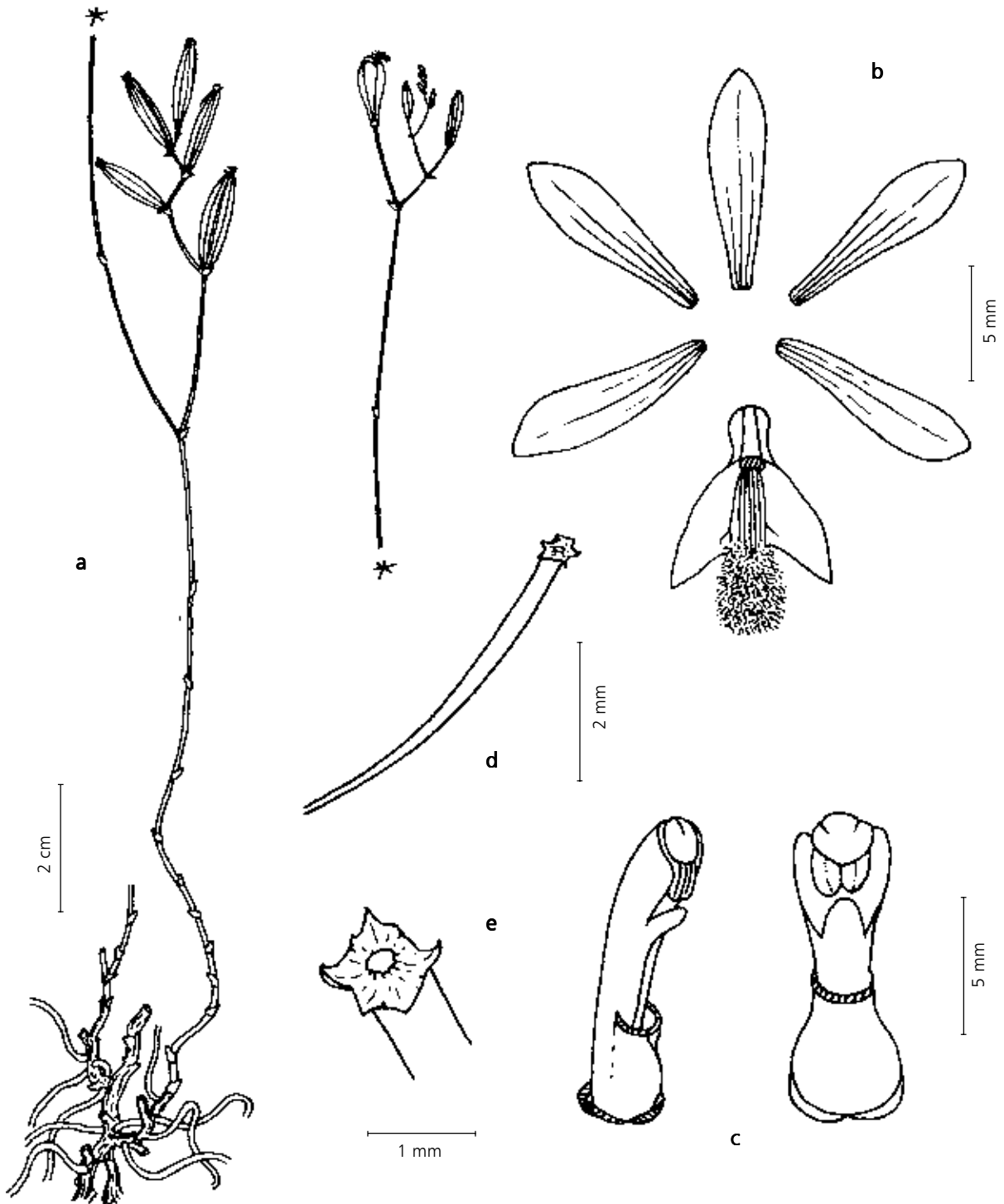


Figure 7. *Lecanorchis vietnamica* Aver. – a. Flowering and fruiting plant; b. Flattened sepals, petals and lip; c. Column, lateral and frontal view; d. Developing capsule; e. Calyculus at the apex of developing capsule (all drawn from the type by the author).



Figure 8. *Cheirostylis serpens* Aver. – **a, b.** Flowering plant (type specimen); *Gastrodia theana* Aver. – **c-e.** Flowering plant and flowers (type specimens); *Lecanorchis vietnamica* Aver. – **f-i.** Flowering and fruiting plants; (**f, g, i** – paratype, HAL 6982; **h** – type specimen). All photographed by the author.

disc of the lip with U-shaped high callus surrounding nectary; column, stout, 2.5-3 mm high, at front with large wings coming along all its length, broadening into triangular plate towards the apex. *Fruit* ovate, capsule 4-5 x 2-2.5 mm.

Etymology: Species name refers to the character of slender filiform inflorescence.

Flowering: June, October-January.

Ecology: Primary and secondary evergreen and semi-deciduous, seasonal, broad-leaved, shady, wet, closed

lowland and submontane forests on rocky limestone and basalt at elevations 400-1550 m.

Distribution: VIETNAM (Cao Bang Prov., Ba Be, Nguyen Binh and Trung Khanh Distr.; Ha Giang Prov., Quang Ba Distr.; Ninh Binh Prov., Cuc Phuong National Park; Thanh Hoa Prov., Ba Thuoc Distr.).

Note: This taxon belongs to the group of miniature species with long pendulous slender inflorescence, small strongly bended lip and large U-shaped callus on its centre. The new species differs from related

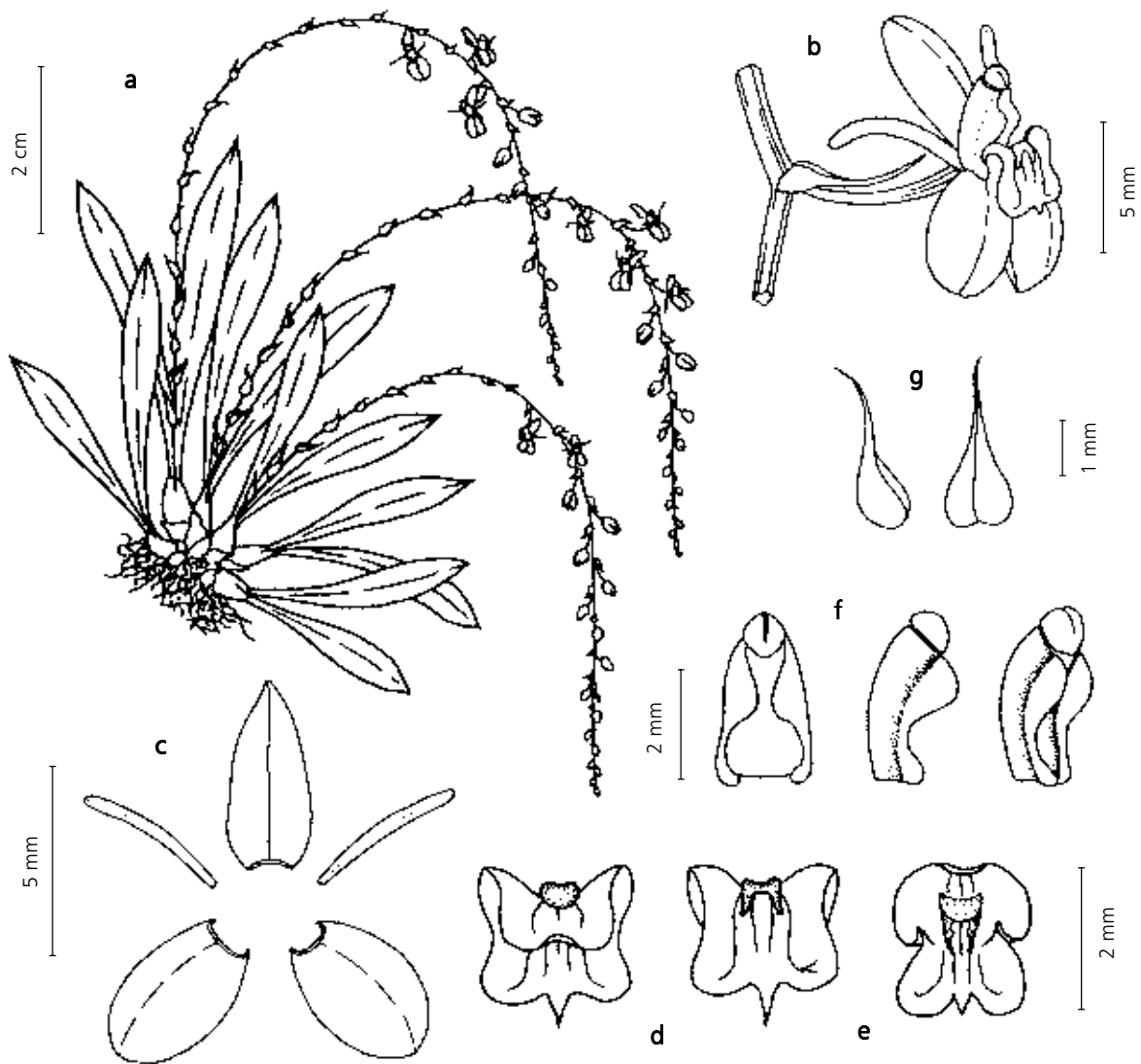


Figure 9. *Liparis filiformis* Aver. – a. Flowering plant; b. Flower; c. Flattened sepals and petals; d. Lip, frontal view and view from behind; e. Flattened lip; f. Column frontal and lateral views; g. Scape and floral bracts (all drawn from the type by the author).

species of this group such as *Liparis aurita* Ridl., *L. delicatula* Hook. f. and *L. tenuis* J. J. Smith distributed in Malesia in having distinctly 3 lobed epichile with triangular, acute mid-lobe and distinctly from similar Himalayan species like *L. assamica* King et Pantl. in lacking extra keels on lateral sides of column and in having large U-shaped callus on the center of lip. This remarkable Vietnamese species represents strict endemism of northern part of Eastern Indochina.

Oberonia huensis Aver., *sp. nov.* Figs 10, 11 c, d.

Inflorescentia longa, ad 15 cm lg., foliis multe longiora; bracteolae floribus longiorae; labium trilobum, lobis lateralibus rotundatis, margine irregulariter denticulatis vel crenulatis, lobo medio late ovato vel suborbiculato, apice leviter oblique et acute inciso.

Type: VIETNAM, Thua Thien-Hue Prov., Nam Dong Distr., Huong Son Municipality, around point 16° 09'52"N, 107° 36'22"E, at elev. c. 300 m, 23 March 2005, L.Averyanov, N.T.Hiep, P.K.Loc, P.V.The, A.Averyanova, N.T.Vinh, HAL 6793 (Holotype, HN; Isotype, LE). Not common.

Paratype: VIETNAM, Bac Kan Prov., Na Ri Distr., Liem Thuy Municipality, village Na Bo, around point 21° 56'44"N, 106° 05'09"E, at elev. 300-700 m, 27 May 2004, L.Averyanov, N.T.Hiep, P.V.The, N.T.Vinh, HAL 4937 (HN; LE). Occasional.

Miniature acaulescent epiphyte with 3-5 close, rosulate, laterally compressed, fleshy, flat, imbricate leaves. *Leaves* lanceolate-ensiform, straight or slightly falcate, acute, 2-6 cm long, 3-7 mm wide, not articulate at the base. *Inflorescence* 6-14 cm long, many-flowered. *Scape* 1-3 cm long, covered with numerous narrowly-triangular acute to acuminate bracts; rachis 4-13 cm long, longitudinally ridged; flowers in middle part of the inflorescence arranged spirally or in close irregular whorls and placed in distant regular whorls toward the apex, each with 7-9 flowers, floral bracts narrowly-ovate to narrowly-triangular, acute to acuminate, entire or finely dentate along margin, 1.5-2 mm long, 0.2-0.4 mm wide, reflexed and spreading, longer than flowers, green to red; pedicel and ovary about 0.3-0.5 mm long. *Flowers* brightly red to red-brown, widely opening, 1-1.2 mm across; sepals and petals sub-similar, ovate, with entire edges, concave, obtuse to rounded, 0.7-0.8 mm long, 0.2-0.4 mm wide, petals slightly smaller; lip 3 lobed, 0.7-1 mm long and wide, with concave fovea at base; side lobes orbicular to obliquely-obovate, erose, irregularly dentate to crenulate along margin; mid lobe, orbicular to broadly obovate, with entire edges, bilobulate at apex, usually with small blunt median dent; lobules broad, oblique,

incurved, obtuse to acute; column short, stout, 0.2-0.3 mm tall and wide; anther cup large, hemispherical, about 0.2 mm across. *Fruit* narrowly-obovate, stalked; capsule 2-2.5 mm long, 1-1.2 mm wide.

Etymology: Species name denotes type locality in the vicinities of Hue city in central part of Vietnam.

Flowering: March-June.

Ecology: Primary evergreen, broad-leaved, closed, shady, lowland forests on clayey shale and rocky limestone at elevations 300-700 m, common on mossy trees along streams.

Distribution: VIETNAM (Bac Kan Prov., Na Ri Distr.; Thua Thien – Hue Prov., Nam Dong Distr.).

Note: In shape and structure of tepals and lip, the new species resembles the strictly endemic species such as *Oberonia marina* J. B. Comber, *O. quadridentata* Aver. and *O. rasmussenii* Seidenf. reported from Thailand, Vietnam, Malacca and Java. However, it differs from all these species in distinctly bilobulate lip, with retuse or acute lobules, long pendulous inflorescence and long floral bracts much exceeding the flowers. This species is probably endemic to lowland areas of central and northern parts of Vietnam.

Saccolabiopsis viridiflora Aver., *sp. nov.* Figs 11 e,f, 12

Flores viridis; labium late infundibuliforme, rhomboideum, integrum vel indistincte trilobum, basi late concavum, ecalcaratum, callo dorsali lamella lata transversali ligulata conformi.

Type: VIETNAM, Thua Thien-Hue Prov., Nam Dong Distr., Huong Son Municipality, around point 16° 10'22"N, 107° 36'24"E, at elev. c. 300 m, 29 March 2005, L.Averyanov, P.K.Loc, P.V.The, A.Averyanova, N.T.Vinh, HAL 7072 (Holotype, HN; Isotype, LE). Occasional.

Paratype: VIETNAM, Thua Thien – Hue Prov., Huong Thuy Distr., Duong Hoa Municipality, Huong Thuy forest enterprise territory, around point 16° 12'50"N, 107° 36'29"E, mt., hill slopes composed with shale at elev. c. 200 m, 15 May 2005, L.Averyanov, P.K.Loc, T.V.Thao, N.T.Vinh, HAL 8308 (HN; LE). Rare.

Miniature canopy epiphyte with monopodial, unbranching short stem and 3-6 close, distichous leaves. *Stem* pendulous or spreading, 0.5-1.5 cm long, covered by overlapping leaf sheaths, with numerous clustered, twisted roots at basal part. *Leaves* sessile, broadly-lanceolate to oblong-elliptic, slightly falcate, 1.5-6 cm long, 0.4-1.2 cm wide, unequally bifid at apex; lobules oblique-triangular, obtuse to acute. *Inflorescence* lateral, pendulous, with many lax flowers; scape slender, 1-1.5 cm long with 2-3

triangular-ovate, acute bracts, broadening into rather thick, fleshy rachis; rachis straight or slightly curved, longitudinally ridged, 2-4.5 cm long, 1-1.5 mm thick; Floral bracts narrowly-triangular, obtuse, adpressed to pedicel or reflexed, 1.2-1.8 mm long; pedicel and ovary 1-1.5 mm long, glabrous. *Flowers* resupinate, odorless, widely opening, 1.8-2.2 mm across; sepals and petals spreading, light green, sub-similar, narrowly-obovate, oblong-elliptic, 1.4-1.6 mm long, 0.4-0.6 mm wide, obtuse to rounded; lip adnate to column, white to light greenish with green spot at the centre, broadly trumpet-shaped, rhomboid, 1.4-1.6 mm long,

1.6-1.8 mm wide, entire to indistinctly 3-lobed, broadly concave at base, spurless, with back-wall callus in the form of wide transversal ligulate lamella; epichile broadly triangular, obtuse to rounded at apex, decurved, with low orbicular callosity at the center; column green, simple, without column-foot, broadening from narrow base, 0.5-0.7 mm tall, 0.3-0.4 mm wide, with triangular-acute, tapering, forward protruding rostellum and low cushion at base; anther cap yellow, tall helmet-shaped, 0.3-0.4 mm across, with prominent acute beak; pollinia 4, orange-brown, very unequal in size, arranged in 2 bodies, solid; stipe

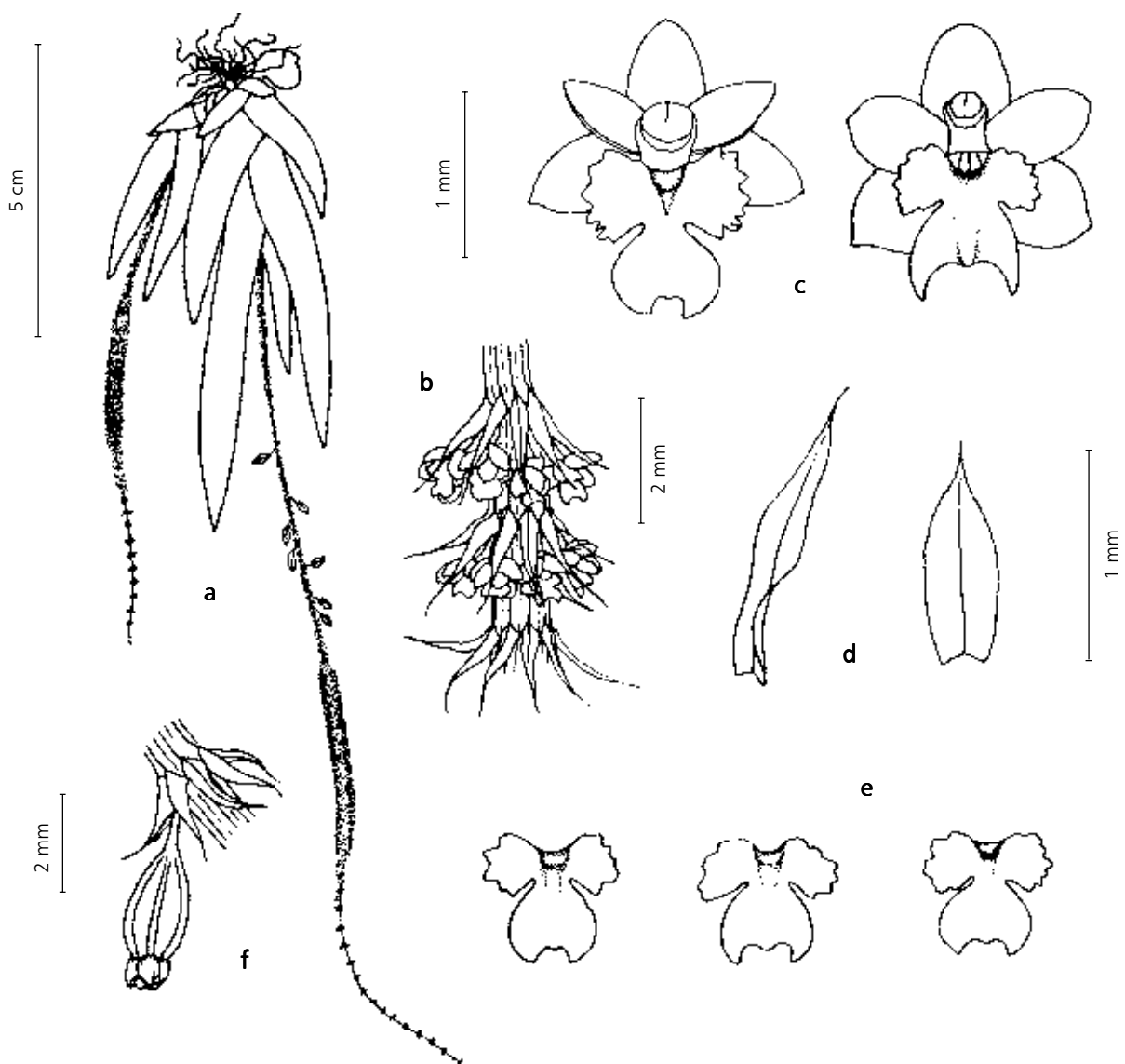


Figure 10. *Oberonia huensis* Aver. – a. Flowering and fruiting plant; b. Fragment of inflorescence; c. Flowers with different shape of the lip; d. Scape and floral bracts; e. Lip shape variation; f. Fragment of inflorescence with ripe capsule (all drawn from the type by the author).



Figure 11. *Liparis filiformis* Aver. – **a, b.** Flowering plant and flowers (**a** – type specimen; **b** – paratype, HAL_2901); *Oberonia huensis* Aver. – **c, d.** Flowering plant and flowers (type specimen); *Saccolabiopsis viridiflora* Aver. – **e, f.** Flowering plant and flowers (type specimen). All photographed by the author.

simple, with ovate viscidium and linear stalk broadening into rhomboid plate toward the apex. *Fruit* narrowly-elliptic to cylindrical, stalked capsule 6–8 mm long, 1–1.5 mm wide.

Etymology: Species name refers to the predominant flower color.

Flowering: March–April.

Ecology: Growing on thin twigs and on coriaceous perennial leaves in terminal zone of tree and shrub canopies. Primary and secondary broad-leaved, evergreen, closed, lowland forests on clayey shale and

sandstone at elevation 200–300 m, particularly along shady, humid stream and river valleys.

Distribution: VIETNAM (Thua Thien-Hue Prov., Huong Thuy and Nam Dong Distr).

Note: *Saccolabiopsis viridiflora* is close to *S. pusilla* (Lindl.) Seidenf. et Garay., a lone species of the genus distributed in the mainland Asia and to *S. tenella* (Ames) Garay reported from Philippines. From these and other species of the genus our plant differs in spurless, broadly concave, trumpet-shaped lip, which bears rising, broad, transversal,

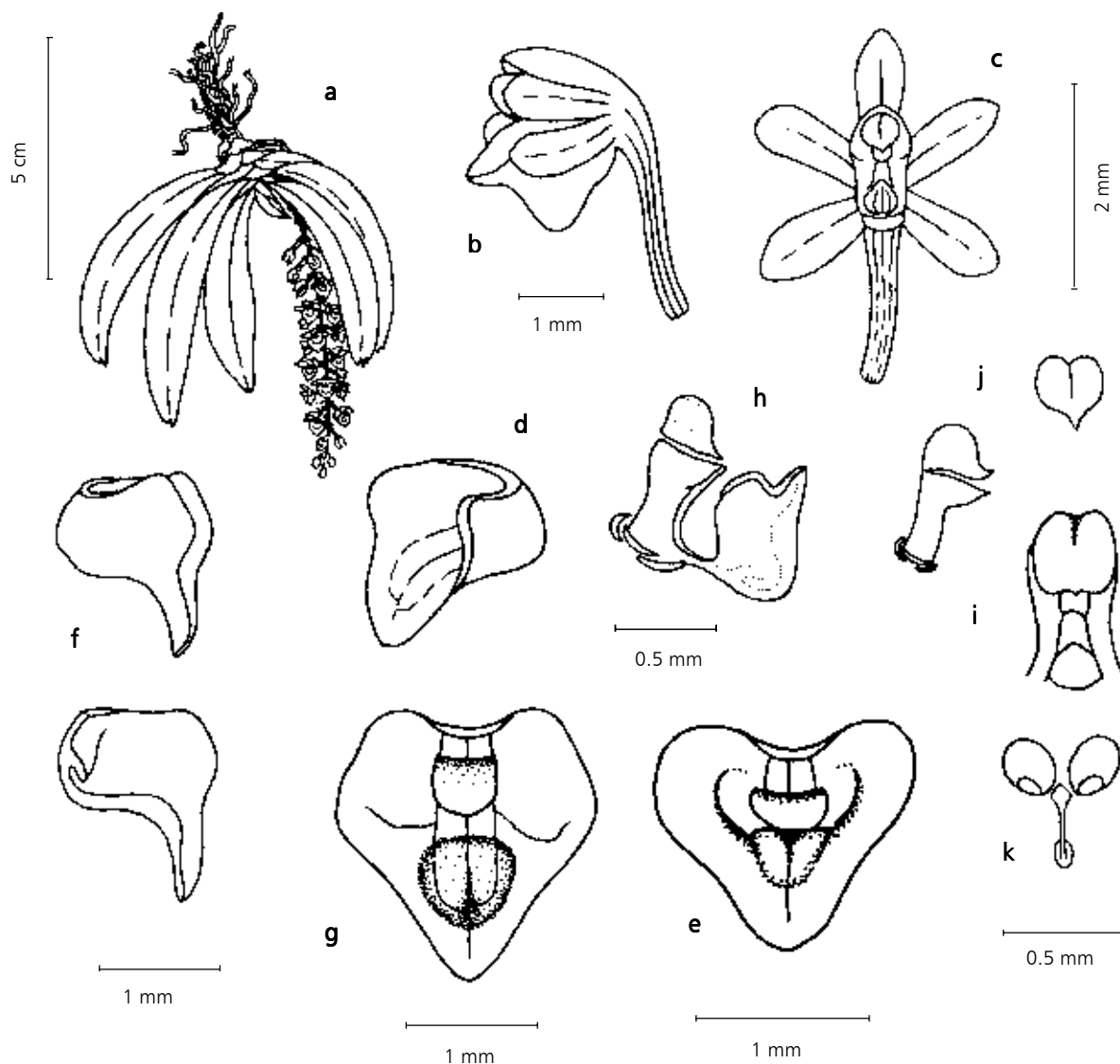


Figure 12. *Saccolabiopsis viridiflora* Aver. – **a.** Flowering plant; **b.** Flower, side view; **c.** Flower with flattened sepals and petals (without lip); **d, e.** Lip, side and frontal view; **f.** Lip, side view and sagittal section; **g.** Flattened lip; **h.** Column and lip, side view; **i.** Lip, side and frontal view; **j.** Anther cup, frontal view; **k.** Pollinarium, frontal view (all drawn from the type by the author).

ligulate callus on back-wall and low circular callosity on epichile. On account of these morphological features, this new species has rather isolated position in the genus. This species represents strict local endemism among lowland indigenous floras of the Central-Annamese floristic province.

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